



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/715,769

11/18/2003

Iwao Inagaki

JP920020212US1

5257

25259

7590

11/21/2006

IBM CORPORATION  
3039 CORNWALLIS RD.  
DEPT. T81 / B503, PO BOX 12195  
REASEARCH TRIANGLE PARK, NC 27709

EXAMINER

RUTTEN, JAMES D

ART UNIT

PAPER NUMBER

2192

DATE MAILED: 11/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/715,769

Applicant(s)

INAGAKI ET AL.

Examiner

J. Derek Rutten

Art Unit

2192

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f):
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. This action is in response to Applicant's submission filed 9/6/2006, responding to the 6/6/2006 Office action which detailed the rejection of claims 1-22. No amendments have been made. Claims 1-22 remain pending in the application and have been fully considered by the examiner.

### ***Response to Arguments***

2. Applicants' arguments on page 2 regarding the drawings have been considered and are persuasive. The objection to the drawings has been withdrawn.

3. On pages 2 and 3, Applicants essentially argue that since claims 6 and 17 are considered statutory, then claims 1 and 12 must also be statutory. This argument is unpersuasive. In fact, the opposite of this argument is true. If claim 1 was considered statutory, then claim 6 would have to be statutory since claim 6 carries all the limitations of claim 1. However, if patent eligible subject matter is not found in a parent claim, but is instead found in a dependent claim, then the parent claim is not statutory even if the dependent claim is statutory. The rejection of claims 1-5 and 12-16 are maintained.

4. At the top of page 4 regarding claims 1 and 12, Applicants essentially argue that the prior art, i.e. Alexander, does not disclose that a routine is not registered for each executed thread. This argument is not persuasive since Alexander discloses "a call stack tree is maintained for each thread" (column 6 lines 20-21).

Also in regard to claim 1, Applicants argue that the Alexander reference does not disclose "(i) tracing processing being executed based upon the registration information." It is noted that

Art Unit: 2192

this language is not found in the claim, which is directed to “determining a level of a tracing process for the routine being executed based on registration information.” Alexander discloses determining “the thread’s ‘current tree node’.” In this case, the tree is interpreted as the registration information, the level is related to the node level, and the routine is the thread.

Applicants further argue in regard to claim 1, that the Alexander reference does not disclose “(ii) a determination of a level of the tracing process.” However, as implied above, this is related to Alexander’s identification of a tree node. Therefore, Applicants’ arguments are not persuasive, and the rejection is maintained.

5. At the bottom of page 4, Applicants essentially argue with respect to claims 2 and 13 that the Alexander reference does not disclose determining a level based on a registered routine. However, Alexander describes “if the module is already a child node.” Here, the child node corresponds to the registered routine. Thus, Applicants’ arguments are not persuasive and the rejection is maintained.

6. At the top of page 5, Applicants essentially argue with respect to claims 3 and 14 that Alexander does not disclosed a table. This argument is not persuasive since Alexander discloses a table in column 4 lines 13-15 as static information in a trace text file. Thus, the table of Fig. 3 is not simply an “illustration” as suggested by Applicants, but is interpreted at least as a table in a text file. The rejection is maintained.

7. Further on page 5, Applicants essentially argue in regard to claims 4 and 15 that Alexander’s disclosure is not comparable to the claimed elements. Applicant’s arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define

Art Unit: 2192

a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

8. At the bottom of page 5 through the top of page 6, Applicants essentially argue with respect to claims 8, 9, 19 and 20, that the passage cited in the Office Action is unrelated to previously cited passages, i.e. that Fig. 5 is not presented in the same context as Fig. 7, and is therefore not combinable. This argument is not persuasive. Alexander's invention is directed to storing trace information as a "tree of events" (column 2 lines 25-26). FIGS. 5 and 7 are both descriptive of this tree of events and are therefore complementary. The "simultaneous execution information" is interpreted as Alexander's "RL 132," which describes the recursion level. Therefore, the rejections are maintained.

9. In response to applicant's argument with respect to the rejection of claims 5 and 16 at the bottom of page 6 through page 7, that the combination of Alexander and Broberg does not yield the claimed invention, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In this case, Broberg suggests that shared resources, such as I/O activities and others used by kernel level threads, should be traced. This provides motivation to one of ordinary skill in the art to modify Alexander according to the teaching of Broberg. Thus, this argument is not persuasive, and the rejections are maintained.

Art Unit: 2192

10. At the bottom of page 7 through page 8, Applicants essentially argue that the Larus reference does not teach “unrestricted execution” in response to registered information. In this case, the registered information is the sets of instructions (easy, hard, or impossible) that prompt tracing. Easy and hard instructions enjoy unrestricted execution since they do not need to be traced. See the bottom of column 1 on page 57: “This technique only requires a tracing system to record results from impossible instructions.” The rejection is maintained.

Applicants further argue with respect to claim 7, that Larus does not teach blocking based upon a second routine. This argument is not persuasive since the plain language of the claim does not necessarily call for a second routine. The claim simply calls for an “identical” routine along with alternative language (“or in a predetermined relation”) that might call for a second routine. Use of the alternative language allows interpretation of the claim using the identical routine only. The rejection is maintained.

11. Applicant's arguments on pages 9 and 10 fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

***Claim Rejections - 35 USC § 101***

12. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

13. Claims 1-5 and 12-16 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 1 is directed to an “information processor” and

Art Unit: 2192

recites means for “registering a routine” and “determining a level of a tracing process”.

However, these limitations fall short of actually producing a useful and tangible result. While the elements of the claim are *necessary* for providing the utility as disclosed in the specification (e.g. page 2 paragraph [008] and page 6 paragraph [030]), they do not actually *provide* any useful result in the form of enabling control or analysis of threads or routines that access shared resources. In contrast, claim 6 is exemplary for using an indication of “permission...for unrestricted execution” of identically registered routines. In this case a useful and tangible result is obtained, and the claim is statutory. Claim 12 is a method claim including similar limitations to claim 1, and is rejected for the same reasons as provided above. Claims 2-5 and 13-16 are dependent upon rejected base claims and are rejected for similar reasons as presented above. For further information, see MPEP 2106.

### ***Claim Rejections - 35 USC § 102***

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 1-4, 8, 9, 12-15, 19, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by prior art of record U.S. Patent No. 6,055,492 to Alexander et al. (hereinafter “Alexander”).

In regard to claim 1, Alexander discloses:

*An information processor suitable for executing a routine (See FIG. 2) including a tracing process for collecting information related to multithreading processing status, the information processor comprising:*

*routine registration means for registering a routine being executed for each thread being activated; and See column 6 lines 25-28:*

The time, type of event (i.e. in this case, whether the event is a method entry or exit), the name of the module (i.e. method), location of the thread's call stack, and location of the thread's "current tree node" are then obtained (step 172).

*level determination means for determining a level of a tracing process for the routine being executed based on registration information registered by the routine registration means. See column 6 lines 37-39:*

If the trace event is an enter event, a check is made to determine if the module is already a child node of the current tree node (step 180).

In regard to claim 2, the above rejection of claim 1 is incorporated. Alexander further discloses: *wherein the level determination means performs the level determination of the tracing process for the routine being executed based on whether a routine identical to, or in a predetermined relation with, the routine is registered. See column 6 lines 37-43.*

In regard to claim 3, the above rejection of claim 2 is incorporated. Alexander further discloses: *a table in which routines having a predetermined mutual relation are specified. See FIG. 3.*



In regard to claim 4, the above rejection of claim 3 is incorporated. Alexander further discloses: *means for accepting input for setting or changing the table*. See column 4 lines 18-20.

In regard to claim 8, the above rejection of claim 1 is incorporated. Alexander further discloses: *wherein, responsive to registration of a routine, the level determination means adds, if there is already registered a routine identical to or in a predetermined relation with the routine being registered, simultaneous execution information to registration information of both the routine being registered and the routine already registered*. See column 5 lines 50-52.

In regard to claim 9, the above rejection of claim 8 is incorporated. Alexander further discloses: *wherein the simultaneous execution information includes trace level information indicating the level of the tracing process*. See column 5 lines 47-48.

In regard to claims 12-15, 19, and 20, Alexander discloses a tracing method. See FIG. 6. All further limitations have been addressed in the above rejections of claims 1-4, 8, and 9, respectively.

***Claim Rejections - 35 USC § 103***

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claims 5 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alexander as applied to claims 2 and 13 above, and further in view of prior art of record “Visualization and Performance Prediction of Multithreaded Solaris Programs by Tracing Kernel Threads” by Broberg et al. (hereinafter “Broberg”).

In regard to claim 5, the above rejection of claim 2 is incorporated. Alexander does not expressly disclose: *routines that access a shared resource*. However, Broberg teaches tracing routines, such as user level threads and kernel threads, that access shared I/O resources. See page 1 column 2 paragraph 2. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Broberg’s teaching of shared resources with Alexander’s routines. One of ordinary skill in the art would have been motivated to trace such routines in order to handle various I/O activities as suggested by Broberg (page 1 column 2 paragraph 2).

In regard to claim 16, the above rejection of claim 13 is incorporated. All further limitations have been addressed in the above rejection of claim 5.

19. Claims 6, 7, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alexander as applied to claims 1 and 12 above, and further in view of prior art of record “Efficient Program Tracing” by Larus (hereinafter “Larus”).

In regard to claim 6, the above rejection of claim 1 is incorporated. Alexander does not expressly disclose: *wherein the level determination means indicates permission, in determining the level of the tracing process for the routine being executed, for unrestricted execution of a tracing process if a routine identical to, or in a predetermined relation with, the routine being executed is registered.* However, Larus teaches a level determination scheme that provides an indication of unrestricted execution upon encountering “Easy instructions,” “Hard instructions” or “impossible instructions” (see page 57, bottom of column 1). Easy and hard instructions enjoy unrestricted execution since they do not need to be traced. These instructions must inherently be “registered”, otherwise there would be no way for the tracing system to know which type of instruction they belong to. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Larus’ teaching of unrestricted execution permission with Alexander’s level determination means in order to provide an accurate program trace as suggested by Larus.

In regard to claim 7, the above rejection of claim 1 is incorporated. Alexander does not expressly disclose: *wherein the level determination means blocks, in*

*determining the level of the tracing process for the routine being executed, execution of a tracing process unless a routine identical to, or in a predetermined relation with, the routine being executed is registered.* However, Larus teaches that certain types of instructions in an address slice do not need to be traced unless they are registered as “impossible instructions” (See page 57 bottom of column 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Larus’ teaching of blocking tracing instructions with Alexander’s methods in order to reduce the information that must be collected as suggested by Larus.

In regard to claims 17 and 18, the above rejection of claim 12 is incorporated. All further limitations have been addressed in the above rejection of claims 6 and 7, respectively.

20. Claims 10 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alexander as applied to claims 1 and 12 above, and further in view of prior art of record “Debugging with GDB” by the Free Software Foundation, Inc. (hereinafter “GDB”).

In regard to claim 10, the above rejection of claim 1 is incorporated. Alexander discloses a trace executioner that provides level determination (See column 6 lines 37-39) and an application execution control part for executing the routine (inherent in execution of a program trace, otherwise the routine would not execute). Alexander does not expressly disclose: *a server program including the routine and the tracing process;*

*...executing the routine in response to a call of the routine by a client program; and ... executing the tracing process in response to a request by the application execution control part.* However, GDB teaches such a system of tracing using a server that responds to requests by a client in order to control application execution and tracing. See at least the first 3 paragraphs of chapter 10 "Tracepoints" in addition to supporting documentation in chapters 16 and 17. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use GDB's teaching of distributed tracing with Alexander's application executioner and trace executioner in order to trace applications that require flexible execution environments, as suggested by GDB (see Chapter 16).

In regard to claim 21, the above rejection of claim 12 is incorporated. All further limitations have been addressed in the above rejection of claim 10.

21. Claims 11 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alexander as applied to claims 1 and 12 above, and further in view of prior art of record U.S. Patent No. 6,163,881 to Sauvage (hereinafter "Sauvage").

In regard to claim 11, the above rejection of claim 1 is incorporated. Alexander further discloses: *a program for using the routine including a tracing process (as depicted in FIG. 4); ... and a trace executioner for executing the tracing process in response to a request by the routine used by the program (as depicted by the trace record*

of FIG. 3); *wherein the trace executioner inquires, when executing the tracing process, the level determination means to determine the level of the tracing process* (See column 6 lines 37-39). Alexander does not expressly disclose: *a shared library in which the routine including the tracing process is stored*. However, Sauvage teaches using shared libraries to interface with programs. See FIG. 4. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Sauvage's shared library with Alexander's routines and tracing process in order to simplify complex programs as suggested by Sauvage (column 1 lines 16-25).

In regard to claim 22, the above rejection of claim 12 is incorporated. All further limitations have been addressed in the above rejection of claim 11.

### ***Conclusion***

22. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

Art Unit: 2192

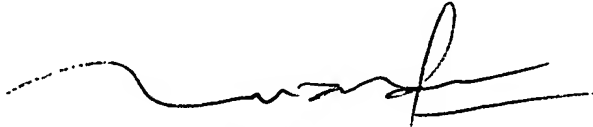
however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to J. Derek Rutten whose telephone number is (571)272-3703. The examiner can normally be reached on T-F 6:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (571)272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JDR



TUAN DAM  
SUPERVISORY PATENT EXAMINER